REMARKS

This Response is in response to the final Office Action mailed on December 13, 2007. Claims 1-20 are pending.

§103 Rejections:

Claims 1-5 and 8-20 are rejected as being unpatentable over Voss (US Patent No. 7,233,354) in view of Fossum (US Patent No. 5,949,483). This rejection is traversed.

Claim 1 is directed to a solid-state imaging device that requires, among other features, an adding circuit comprising an adding portion, a gain control portion and a storage portion, so that an output of the adding circuit is subjected to a gain control by the gain control portion and then stored in the storage portion. Claim 1 further requires, on the basis of a predetermined reference quantity of light incident onto the imaging region, a gain of the adding circuit in a condition in which a quantity of the incident light is above the reference quantity is controlled to be smaller than a gain of the adding circuit in a condition in which a quantity of the incident light is below the reference quantity. An advantage of these features is that under a large quantity of incident light that is larger than a reference quantity, a gain of the adding circuit is made small, thereby enlarging a dynamic range in a large quantity of light.

The combination of Voss and Fossum does not teach or suggest these features. The rejection relies on Voss for teaching an adding circuit comprising an adding portion, a gain control portion and a storage portion, so that an output of the adding circuit is subjected to a gain control by the gain control portion and then stored in the storage portion, and for teaching, on the basis of a predetermined reference quantity of light incident onto the imaging region, a gain of the adding circuit in a condition in which a quantity of the incident light is above the reference quantity is controlled to be smaller than a gain of the adding circuit in a condition in which a quantity of the incident light is below the reference quantity. Voss is directed to a digital camera that includes a light-level sensor (55) that measures the ambient light-level. When the measured light-level is low, the digital camera performs an adjustment in CMOS pixel resolution such that a plurality of pixels are combined into a group according to a look-up table , with a gain when adding pixel signals being set by a microprocessor (32) (see Figures 1, 1A and 2A-

2C of Voss). Thus, while Voss teaches a configuration for increasing a sensitivity under a dark condition by combining a plurality of pixels into a group, nowhere does Voss teach or suggest controlling a gain of an adding circuit when the measured light-level is too high, without changing a number of pixels to be combined. Accordingly, nowhere does Voss teach or suggest, on the basis of a predetermined reference quantity of light incident onto the imaging region, a gain of the adding circuit in a condition in which a quantity of the incident light is above the reference quantity is controlled to be smaller than a gain of the adding circuit in a condition in which a quantity of the incident light is below the reference quantity.

Fossum is directed to a CMOS type imaging device in which only a configuration for increasing a sensitivity under a dark condition is provided. Thus, nowhere does Fossum teach or suggest, on the basis of a predetermined reference quantity of light incident onto the imaging region, a gain of the adding circuit in a condition in which a quantity of the incident light is above the reference quantity is controlled to be smaller than a gain of the adding circuit in a condition in which a quantity of the incident light is below the reference quantity. For at least these reasons claim 1 is not suggested by the combination of Voss and Fossum and should be allowed. Claims 3-11 and 19 depend from claim 1 and should be allowed for at least the same reasons.

Claim 2 is directed to a solid-state imaging device that requires, among other features, an adding circuit comprising an adding portion, a gain control portion and a storage portion, so that an output of the adding circuit is subjected to a gain control by the gain control portion and then stored in the storage portion. Claim 2 further requires that, within at least a partial range of a quantity of incident light onto the imaging region, a gain of the adding circuit is controlled to decrease with an increase of the quantity of the incident light. An advantage of these features is that as the quantity of incident light increases, the gain of the adding circuit is decreased continuously, so that a wider dynamic range can be obtained.

The combination of Voss and Fossum does not teach or suggest these features. The rejection relies on Voss for teaching an adding circuit comprising an adding portion, a gain control portion and a storage portion, so that an output of the adding circuit is subjected to a gain control by the gain control portion and then stored in the storage

portion, and for teaching, within at least a partial range of a quantity of incident light onto the imaging region, a gain of the adding circuit is controlled to decrease with an increase of the quantity of the incident light. As discussed above, Voss is directed to a digital camera that includes a light-level sensor (55) that measures the ambient light-level. When the measured light-level is low, the digital camera performs an adjustment in CMOS pixel resolution such that a plurality of pixels are combined into a group according to a look-up table , with a gain when adding pixel signals being set by a microprocessor (32) (see Figures 1, 1A and 2A-2C of Voss). Thus, while Voss teaches a configuration for increasing a sensitivity under a dark condition by combining a plurality of pixels into a group, nowhere does Voss teach or suggest controlling a gain of an adding circuit when the measured light-level is too high, without changing a number of pixels to be combined. Accordingly, nowhere does Voss teach or suggest, within at least a partial range of a quantity of incident light onto the imaging region, a gain of the adding circuit is controlled to decrease with an increase of the quantity of the incident light.

Fossum is directed to a CMOS type imaging device in which only a configuration for increasing a sensitivity under a dark condition is provided. Thus, nowhere does Fossum teach or suggest, within at least a partial range of a quantity of incident light onto the imaging region, a gain of the adding circuit is controlled to decrease with an increase of the quantity of the incident light. For at least these reasons claim 2 is not suggested by the combination of Voss and Fossum and should be allowed. Claims 12-18 and 20 depend from claim 2 and should be allowed for at least the same reasons.

Claims 6 and 7 are rejected as being unpatentable over Voss in view of Fossum and further in view of Takayama (US Patent No. 7,088,395). This rejection is traversed. Claims 6 and 7 depend from claim 1 and should be allowed for at least the same reasons described above. Applicants do not concede the correctness of this rejection.

Conclusion:

Applicants respectfully assert that claims 1-20 are in condition for allowance. If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 455-3804.

Respectfully submitted,

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Dated: March 10, 2008

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